

23

AN ADDRESS.

---

THE CLAIMS

OF THE

ACADEMY OF NATURAL SCIENCES

OF

PHILADELPHIA

TO PUBLIC FAVOR.

BY

W. S. W. RUSCHENBERGER.

---

"No one with an unbiased mind can study any living creature, however humble, without being struck with enthusiasm at its marvellous structure and properties."—DARWIN: *Descent of Man*.

---

PHILADELPHIA:

COLLINS, PRINTER, 705 JAYNE STREET.

1871.







A N A D D R E S S .

---

THE CLAIMS

OF THE

ACADEMY OF NATURAL SCIENCES

OF

PHILADELPHIA

TO PUBLIC FAVOR.

BY

W. S. W. RUSCHENBERGER.

---

"No one with an unbiased mind can study any living creature, however humble, without being struck with enthusiasm at its marvellous structure and properties."—DARWIN: *Descent of Man*.

---

PHILADELPHIA:

COLLINS, PRINTER, 705 JAYNE STREET.

1871.



Digitized by the Internet Archive  
in 2018 with funding from

This project is made possible by a grant from the Institute of Museum and Library Services as administered by the Pennsylvania Department of Education through the Office of Commonwealth Libraries

## ADDRESS.

---

IN compliance with a resolution that the president of the society "be requested to prepare an address, stating the claims of the Academy of Natural Sciences to the support of the public," the following statement is submitted. It is hoped that it may be found a brief of most of the points which should be fully set forth in a detailed exposition of the subject.

An effort to obtain means to erect a new building for the Academy of Natural Sciences of Philadelphia was begun several years ago [Dec. 26, 1865], and will be continued till it results clearly in success or failure. The appeal then made to the public was generously answered.\* Subscriptions were asked and made payable on condition that an aggregate of \$100,000 should be subscribed by Dec. 31, 1866. Then it reached \$108,000. Contributions made since that day do not amount to a thousand dollars.

The obligation to pay the subscriptions being made contingent on their aggregate amounting to \$100,000, seems to have origi-

\* Summary of subscriptions, Jan. 7, 1867:—

No. subscriptions.	Amount.	Aggregate.
1 . . . . .	2100 . . . . .	2100
1 . . . . .	1100 . . . . .	1100
53 . . . . .	1000 . . . . .	53,000
47 . . . . .	500 . . . . .	23,500
1 . . . . .	300 . . . . .	300
38 . . . . .	250 . . . . .	9500
15 . . . . .	200 . . . . .	3000
132 . . . . .	100 . . . . .	13,200
28 . . . . .	50 . . . . .	1400
16 . . . . .	25 . . . . .	400
Smaller contributions	. . . . .	500
		\$108,000



nated an erroneous impression that such sum was enough to accomplish the purpose for which the fund was created. No argument is needed to show that such sum is insufficient to purchase a lot and erect a fire-proof building, even in the plainest style of architecture, of dimensions ample enough to display advantageously the vast collections of the Academy.

In January, 1867, the subscriptions were confided to a board of trustees, consisting of thirteen members of the institution. This board was authorized to select and purchase a site, and erect a new hall; and to collect the contributions, all of which fell due, according to the terms of subscription, March 31, 1867.

When the present hall was built [in 1839-40], sufficient ground for its extension was not secured. The building covers the lot. The necessity for moving the Academy now to another locality is found in this circumstance. To avoid the necessity of moving again from a like cause, at great cost of labor and money, it was considered desirable to procure a lot of sufficient dimensions to meet the probable want of space for the institution during a century. An area of 50,000 square feet, so situated that no part of it must be left unappropriated by the building, in order to secure an abundance of natural light to the structure to be placed upon it, is not too large for the object in view. As the active members of the society appropriate to its service and their own studies in natural science only such fragments of time as they may take from their routine employments, it is of much importance to the prosperity of the institution that it be located so as to be accessible to them at the smallest expenditure of time in going to and from it. Besides, its locality should be free from damp, and as little exposed to sources of dust as possible.

The Board, influenced by such considerations, purchased an eligible lot. It is bounded by three streets, contains more than 48,500 square feet, and is within twelve hundred yards of Broad and Sansom streets. It is readily accessible by the city railways, two of which pass it. Having Logan Square on the north, and a cemetery on the west, it is advantageously situated for light and ventilation. Since its purchase its market value has appreciated at least thirty per cent.

Three eminent architects were invited to submit plans and estimates in competition. The three estimates were \$225,000,

\$238,000, and \$270,000 for the construction of an edifice adapted to the lot, and calculated to meet the present and future requirements of the institution. Neither of the plans was accepted; but the author of that plan which approximated nearest to the wants of the Academy was elected architect. After frequent consultations with a committee of the board, he submitted a plan which was finally approved. It was based on the idea that space enough should be supplied for the easy accommodation of the existing collections, and that providing for the extension of the building and the completion of the design should be left to the future. The plan adopted for execution now, is a wing which will cover an area of sixty-six by one hundred and eighty-four feet, leaving about 36,000 square feet upon which to extend the edifice. The college gothic style of architecture was adopted, because it seems to admit of indefinite extension without violating the appearance of symmetry, and involves little expenditure for ornamentation.

The estimated cost of this wing is \$125,000.

The building-fund is adequate to the construction of little more than the cellar and foundations.

Having expended for the lot, for taxes on it in 1868, 1869, and 1870, for architect's fees and miscellaneous charges, \$71,191.79, the cash balance, Jan. 2, 1871, is \$31,296.84. Of the original subscriptions, \$15,000 have not been collected; but it is confidently believed that they will be ultimately paid.

It is self-evident that \$45,000 will not pay for the erection of a building estimated to cost \$125,000. If the estimate be accurate, the trustees will require at least \$80,000 more to complete the task imposed upon them. Their duty is limited to the erection of the building. After the architect and builders have delivered the edifice into their hands, it will not be ready to be occupied until it is furnished with cabinets and cases in which the collections are to be placed. To supply this furniture, to move, re-arrange, properly label and catalogue the museum and library in the proposed building, will cost not less than \$30,000, besides much time, a great deal of volunteer labor by the curators and members of the several standing committees of the Academy.

Even with unlimited means, the enterprise will be arduous in



its execution. No aid can be had from the ordinary income of the Academy. During the year 1870 the current receipts amounted to little more than \$4600, and the expenditures for salaries of janitors and librarian, for gas, coal, alcohol, freight, postage, etc. etc., exceed \$4100, leaving a small balance for repairs and other contingent expenses. This does not include certain funds held in trust for specific purposes, such as printing, increase of the library, etc.

It is not expected that the trustees should incur debt for which they only would be responsible, in order to erect a new edifice. The society has no resources applicable to this purpose.

The erection of a new hall must be postponed for years, unless an intelligent public shall generously supply the means required. It is desirable that no time should be lost in the execution of this project. The centennial anniversary of the proclamation of our national independence is approaching. It is to be celebrated here by an exhibition of the results of American enterprise in agriculture, and every department of the arts, on a scale worthy of the occasion. Many evidences of Pennsylvania's progress in civilization since the birthday of the Republic will then be presented. It is hoped that among them we may see the vast museum and extensive library of the Academy completely arranged in a new building, a tangible proof to the people who will throng the city from every part of our country that the natural sciences have not been neglected in Philadelphia.

Reasons why the Academy of Natural Sciences of Philadelphia may ask the fostering care of citizens generally may be found in its history, in appeals to the public made to obtain means to erect a new building, and in the annual reports of the Board of Trustees of the building-fund.

A summary of those reasons is submitted:—

#### THE OBJECT SOUGHT IN FOUNDING THE ACADEMY.

An earnest desire to learn what was known, and to add through patient study and investigation to the common stock of knowledge, induced a few gentlemen in this city, about sixty years ago, to meet together for mutual instruction concerning the inorganic constituents of the earth, the plants and animals inhabiting it, as well



as the laws of the natural forces under which they exist. They were simply students, seekers after truth and knowledge. They considered the study of nature, while released from their avocations, a source of rational recreation which could never be followed by regret or remorse. Their numbers increased slowly.

Such was the origin of the ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA. Its foundation is dated March 21, 1812. The society was incorporated March 24, 1817. Its name implies a place where instruction within the range of the natural sciences may be always obtained. Any respectable person friendly to the cultivation of these sciences is eligible to membership in the institution, from the stated meetings of which the discussion of political, social, and religious questions is excluded.

The formation of a museum and library, the indispensable implements of teachers as well as of learners, was begun in the earliest days of the Academy. Both grew slowly, but with gradually accelerating progress. The classing, labelling, and arranging the specimens have been done voluntarily by the members, who can give to this work and to their studies only such fragments of time as they may spare from those vocations in which they must labor in order to live.

#### GENERAL ACCOUNT OF THE MUSEUM.

At this time the museum contains more than two hundred and fifty thousand specimens, many of them unique, for instance the restored skeleton of the *Hadrosaurus foulkii*.

The cabinet of MINERALS was begun in 1812, by Mr. John Speakman, who purchased from Dr. Seybert a collection of European minerals for the institution at a cost of \$750. At that time such collections in this city were rare, and books on the subject were almost unknown. From a vast number presented, about 5700 specimens have been selected, arranged, and labelled; the appropriate cases will contain no more.

In the department of GEOLOGY there are about 700 specimens of rocks. There is no space for a cabinet of stratigraphic geology.

The PALÆONTOLOGICAL collection was begun in 1815, by Mr. Jacob Gilliams, with a small collection of fossils from Maryland,

made by himself. It now contains the Steinhaur and Taylor collections of British fossils; the Clifford collection of carboniferous fossils from the valley of the Mississippi; the Poirrier collection of vertebrate fossils, and Eli Bowen's of coal plants. Labelled and arranged in the cases there are now—

Vegetable fossils, foreign and native . . . . .	2,000
Invertebrate . . . . .	25,000
Vertebrate . . . . .	5,000
Unarranged, about . . . . .	33,000
	<hr/>
	65,000

BOTANY.—A small herbarium of plants collected in the environs of Paris, presented in April, 1812, by N. S. Parmentier, was the foundation of the botanical cabinet. Besides about 1000 specimens of fruits and seed vessels, and nearly 100 specimens of different woods, it now includes the herbarium of North American plants, which contains 10,000 species, arranged and labelled; Menke's herbarium of European plants of 7000 species; the herbarium of 15,000 species, collected by the late Professor Charles W. Short, which is not excelled in the scientific world for the magnificence, freshness, and completeness of its specimens, and the costly style of the 300 receptacles or cases containing them; the herbarium of Mr. James M. Lea; the Poiteau collection of 1200 species of St. Domingo plants; and the general herbarium of the Academy, which numbers about 43,000 species—making an aggregate of about 70,000 species, arranged and labelled by distinguished foreign and American botanists. The great merit of the herbarium of North American plants, chiefly derived from the Schweinitz collection, is that it contains a large number of authentic or typical specimens—almost all the plants of Mr. Nuttall, and many from Messrs. Elliot, Baldwin, Pursh, Torrey, Asa Gray, Durand, Curtis, and others. Besides, there is the Ashmead collection of MARINE ALGÆ, and Lesquereux's of over 700 species authenticated by the best algologists of the age; and Ravanell's collection of CRYPTOGRAMS.

Of ZOOPHYTES (star-fishes, sea-eggs, corallines, and sponges), there are about 1000 species; of CRUSTACEANS (crabs), 2000 species of 350 genera; of MYRIAPODS and ARACHNIDANS, about 500 species.



**INSECTS.**—In the department of entomology the Academy has not been fortunate. Almost all the insects obtained during almost thirty years were ruined through some inadvertence or accident. The present cabinet dates from about the year 1844, when a method of preserving the specimens, previously unknown, was adopted. It is estimated that the cabinet contains 25,000 species, each represented by four specimens on an average.

**SHELLS.**—The conchological collection contains 20,000 species, and more than 100,000 specimens of land, fresh-water, and marine shells. It is excelled only by the cabinet of the British Museum.

**REPTILES.**—This department contains 813 species of 307 genera of 47 families of reptiles and serpents of various kinds.

Of fishes (**ICHTHYOLOGY**), there are 1170 species of 379 genera.

**BIRDS.**—The department of **ORNITHOLOGY** is remarkably rich. It is questionable whether in Europe there is one equal to it in number of species and varieties. It consists of more than 31,000 specimens, of which 27,000 are mounted and crowded in the cases. All the species of vultures hitherto described are in this cabinet. The value of this collection to the student of ornithology is difficult to estimate. In many instances numerous specimens are exhibited, to show the variations presented in the same species from sex, age, and period of plumage. This superb collection, which is rich in unique specimens, is in danger of destruction from crowding, as well as from want of means to compensate skilled laborers to keep them free from dust and devouring insects.

**OLOGY.**—There are more than 5000 specimens of upwards of 1500 species of **BIRDS' EGGS**, and about 200 nests. An egg of the great Auk, a species just extinct, cost \$100.

**MAMMALOLOGY.**—There are 379 species of 123 genera represented by 1000 specimens of mammals.

The collection of **COMPARATIVE ANATOMY** contains 271 skeletons, 346 crania, and 259 parts of different animals.

The department of **ETHNOLOGY** was begun in the year 1830. Dr. J. Aitken Meigs classified the human crania, numbering 1225, and published a catalogue of them in 1855. Many additions to this collection have been made since that date. Some collections of ancient Indian art, belonging to the Academy, are deposited elsewhere for want of room.

Besides the crania, there is one human mummy in its sarco-

phagus, and 41 mummified animals, all from Egypt, and three human mummies of the Inca race.

There is a CHEMICAL APPARATUS of about 1500 pieces; but packed away.

The BIOLOGICAL and MICROSCOPICAL section of the Academy possesses a cabinet of 225 mounted specimens of healthy and morbid animal tissues, vegetable structures, mineral substances, etc., a collection of photo-micrographs, which are important illustrations of recent progress in microscopic science; it has also five MICROSCOPES, including Zentmayer's grand American microscope, and one of Powel and Leland's manufacture, besides some accessory apparatus.

At the annual meeting of the section, held last year (1870), at the hall of the College of Physicians of Philadelphia, the members exhibited about a hundred microscopes, many of them of the most perfect construction.

#### SPACE OCCUPIED BY THE MUSEUM.

These grand collections are all crowded, almost heaped together in two apartments, the floors of which measure 110 by 42 feet. The floor-room is augmented by two galleries around the lower, and three around the upper saloon. Three times as much space is needed to arrange advantageously for study and exhibition these collections, begun sixty years ago, and increased at the cost of much money and the voluntary labor of many individuals.

Dr. Leidy, chairman of the curators, says, in the report for 1861, ten years ago: "The limited space occupied by the Academy is fast becoming inconveniently crowded by its collections, and it is to be regretted that we have no provision for a further extension of our space. Certain collections receive no accommodation whatever; as, for instance, a series of rocks or geological specimens. The last resource of the curators to accommodate large objects, is to mount them in the air above the cases occupying the floor, as has been recently done with the skeleton of a whale."



## A GREAT MUSEUM DIFFICULT TO CREATE.

If this museum were destroyed, its exact duplicate could not be formed. Its unique and type specimens could not be replaced. Even under favorable circumstances and abundant means, the foundation of analogous collections would require diligent labor during many years. Vast cabinets of birds, fossils, and shells are not in the markets, even those of moderate extent and value are offered for sale at irregular and often long intervals. These are made up from many smaller ones, often the results of the life-long labors of votaries of science, purchased after their death. The herbarium of the Rev. Lewis David Von Schweinitz, which he bequeathed to the Academy, was the labor of forty years. The same is true of collections in other departments.

No individual ever possessed collections as extensive and complete, even in a single department of natural science, as those of the Academy. Such a museum can be formed only by the joint efforts of many zealous and generous persons, ever ready to secure collections of recognized scientific value when offered for sale, provided they are wholly or partly necessary towards completing one of its departments. Lesquereux's fossil plants, for instance, recently purchased for the museum at Cambridge, would be a treasure in a museum having few or none; but to the museum of this Academy, which is already very rich in the fossil plants of the North American coal formations, they are comparatively of much less value, although they possess a peculiar interest from the distinguished ability of their collector, and the twenty years' labor he bestowed upon them.

## THE OBJECT OF A MUSEUM OF NATURAL SCIENCE.

The popular notion that the purpose of forming this great museum of natural history is purely for exhibition is most erroneous. Its object is to facilitate the labors of students and the investigations of naturalists, who are seeking to characterize forms in the organic and inorganic world, whose existence has not been hitherto recognized. For instance, a votary of science supposes that he has discovered a new animal, plant, or mineral.

To verify his supposition, he needs to compare it with those of the kind previously described. He places his supposed discovery alongside of specimens of its class, and patiently studies its resemblances and differences, and so determines whether he has found a new species or not. He has recourse to the library also in his researches.

#### PUBLIC EXHIBITION OF THE MUSEUM, NOT A PART OF ITS PURPOSE.

If the museum and library were open to the members of the Academy exclusively, the objects for which the institution was founded would not suffer in any appreciable degree. Yet, during nearly a half century it was thrown open to the public without charge, two afternoons in the week. "The movements of crowds of visitors," says the report of the curators, 1861, "give rise to clouds of dust, which penetrates the cases and obscures the specimens." The number of visitors became so large—as many as from three to four thousand crowding into its saloons every afternoon—that few if any of them were able to obtain a satisfactory view of anything in the cases. To obviate this difficulty, and to guard the collections against damage from dust and breakage of glass, it became necessary to reduce it. To attain these ends, a small ADMISSION FEE of ten cents has been charged since June, 1870, and the museum is opened at ten o'clock A.M., instead of at one o'clock P.M., as heretofore. Members as well as friends accompanying them have free access as usual. Thus far the practice of this plan has been satisfactory.

Classes from schools, accompanied by their teachers, have been and are freely admitted. Pupils from the institution for the education of the blind have been afforded opportunities to learn something of the forms of natural objects through the sense of touch. Artists and students from the school of design occasionally resort to the museum and library for aid in the exercise of their beautiful art.

#### THE LIBRARY.

On the 1st of January, 1860, the library was estimated at 24,000 volumes, including 1856 volumes of historical documents.



These and some duplicates, in all about 2000 volumes, have been since disposed of.

The number of volumes now exceeds 22,500.

There are many single works whose cost is beyond the means of individuals generally, even of those possessed of moderate fortunes.

It is worthy of note that in the department of conchology, the library, containing now [May, 1870] 619 volumes, is almost perfect. Of all the books on the subject ever published in the world, there are but three which it does not possess. In several departments of the library, however, many works of reference are much needed, but their price places them at this time beyond the reach of the institution.

In the collection there are more than 400 volumes on antiquities and the fine arts, which are frequently referred to by artists.

Many works in this library are not in any other in the United States; there are a few of which duplicates are not procurable at any price.

The library is maintained for reference exclusively. No work is allowed to be taken out of the hall. No respectable person has ever been refused permission to consult it freely.

#### PUBLICATIONS OF THE ACADEMY.

The first number of a journal of the transactions of the Academy was published May 20, 1817. The first series of this journal, in 1842, when it closed, consisted of eight octavo volumes, illustrated by 161 plates, containing an aggregate of 2912 pages. It contains 237 papers, by 56 members, in which objects not known at the time of publication are technically described.

In March, 1841, the publication of the "Proceedings of the Academy of Natural Sciences of Philadelphia" was commenced, and still continues, improved in form (octavo). It now makes 22 volumes, each on an average of about 400 pages. It reports the written and verbal communications made at the meetings of the society.

The publication of a second series of the Journal of the Academy was begun in December, 1847, in quarto form, and continues. Seven volumes, of an average of 400 pages each, have appeared.

These serials are sustained in part by funds bequeathed by Mrs. Elizabeth Stott, and the late A. E. Jessup, Esq., to be expended in "printing and publishing such papers communicated to the Academy as it may direct."

The conchological section of the Academy publishes a journal of its own transactions, under the title of "American Journal of Conchology."

These publications, containing almost exclusively new and original matter, resulting from the investigations and studies of the members, are exchanged with about 200 kindred institutions established in the United States, in South America, in the several kingdoms of Europe, in European possessions in Asia, and in Liberia.

Through their medium the scientific voice of the Academy is heard throughout Christendom. Its labors are so much respected in the scientific circles of Europe, that "correspondent of the Academy of Natural Sciences of Philadelphia" is placed, by those who have a right to it, among the foremost of the titles which authors often have printed after their names to indicate their claims to their readers' respect.

#### EDUCATIONAL CHARACTER OF THE ACADEMY.

Through the administration of a fund devised to the Academy in trust by the late Mr. A. E. Jessup, for the purpose of assisting young men requiring pecuniary aid while engaged in the study of natural science, several have been carefully educated in the institution, not only without charge, but receiving a monthly stipend; and it is a pleasure to add that their names are distinguished among those who have either directed, or assisted in conducting, geological surveys of states and territories of our country.

In the broad sense of the term, the institution is educational in character, though not scholastic in form. Its exclusive object is to impart instruction. The advanced students are acquiring new facts, and extending knowledge of them in the society's publications. The beneficiaries of the Jessup fund are learning to be practical naturalists. Pupils who, accompanied by their teachers, come from their school-rooms to the museum, receive object



lessons in natural science; even those who are prompted by vague curiosity to visit it, gain some general knowledge from a rapid inspection of the collections, and these will be much more instructive when arranged, as it is hoped they will be, in a new edifice, so as to constitute virtually a model, representing the affiliation and concatenation of all inorganic and organic parts of the earth's structure and its creatures, as well those still living as those known to have existed only through testimony found buried in the rocks to be interpreted by students of nature.

#### LOCATION OF THE ACADEMY.

In connection with such facts, and the long-cherished design to establish systematic teaching by series of regular lectures whenever a suitable lecture-room is provided, the locality of the institution is an important consideration. It should be within easy walking distance of the domicils of those persons who are most likely to resort to it habitually to consult the library, to study or work in the museum, or to listen to lectures. Most of those who are personally interested in the location of the institution have only fragments of time—from one to two hours out of the day—to devote to the pursuit of natural science; every minute deducted necessarily from the appropriated hour in going to or returning from it is doubly a loss, because it is sustained both by the individual and the Academy. The question of time rather than of distance is to be solved. Transportation in city cars is so frequent and rapid, that oppositely extreme ends of the town, which without such conveyance would be far asunder, are brought comparatively close together. But cheap as this transportation is, all intelligent people who would use the institution cannot afford to pay daily the cost of it. Any one point in the city may be reached from every other in from a few minutes to an hour; but it is notorious that the attractions of the opera or of any popular amusement fail if located even a short distance off the most frequented thoroughfares; the Academy of Music placed at Broad and Reed streets, or near Fairmount Park, would be profitless—the transient or hotel population would not seek amusement within its walls.

The convenience of those upon whose patronage and frequent

presence in it the success of an institution depends, must be provided for in this connection. To remove the Academy of Natural Sciences to any position in the city very remote from its present locality will be dangerous if not fatal to its progress on its present course. The vitality of the institution is in the investigatory studies of its members, and the announcement of their progress in verbal and written communications made at the weekly meetings of the society; in printing statements of the results of its labors, and distributing its publications to kindred societies throughout the world; in a word, in being an active and free exchange of knowledge newly acquired in natural science. The museum and library contain the working implements, and are in fact the workshops of the institution. They should be where they are readily accessible to all who labor in them in any degree.

The present locality is in all respects satisfactory. The requirements of the institution, the convenience of guests and students in the city, and a common notion that the new edifice should be an architectural ornament to the street, seem to be the grounds of an opinion very generally entertained, that the new Academy should be built on South Broad Street, but not more than six or seven hundred yards from Market Street. Within these bounds a sufficiently extensive lot is not now purchasable at a price within the limits of the Academy's means.

Even if the museum were designed as a place of public amusement only, it should be located on some common thoroughfare, not far from the precinct in which hotels are numerous, because both public hospitality and policy suggest that the interest and comfort of strangers in such institutions should be considered, even before the convenience of citizens.

In this connection some remarks are submitted on

#### THE VALUE OF A GREAT MUSEUM TO THE PUBLIC.

The value of a great museum of natural history in a community is more easily conjectured than demonstrated. There is an instinctive impulse in man to seek acquaintance with nature's works. Vulgar showmen find profit in catering to this passion, by exhibitions of what are popularly termed "natural curiosities." The



learned and the ignorant alike are gratified, though in different degrees, in viewing even one or two natural objects not previously known to them. No one, even of the smallest cultivation and intelligence, can, without admiration, behold for the first time, thousands of species of birds brought together from every region of the globe, set side by side in groups in one grand assembly, so that their wonderful variations in size, form, and colors may be contrasted and compared. Bring under one view every ore and every gem and every mineral substance yet discovered; or in like manner in separate assemblage, all the fishes, the shells of all shell bearing animals that inhabit the land and the waters; all the crustaceans or crabs, the mammals, the reptiles, the radiates, the insects, spiders, &c., each marked with its appropriate name and locality, and there is established a source of gratification to thousands. The view of one such group of analogous forms alone, although not systematically arranged relatively to other groups, is calculated to awaken inquiry in the mind of the observer, and so lay the foundation of an agreeable mental pursuit. In this aspect a grand museum is a source of pleasure, which brings, in consequence of its gratification, neither mental regrets nor bodily sufferings. It stirs up no sensual emotions, provokes no admiration for what is false, but inclines the observer to perceive that the truth, nature itself, is more worthy of respect and admiration than any imitation or likeness of it.

A complete museum of natural science, designed to instruct and at the same time entertain the public, requires ample space for its arrangement and the classification of the objects which properly pertain to it. The department of mineralogy, for example, in the museum of the Academy of Natural Sciences of Philadelphia, should have space enough for at least two separate collections; one to contain exclusively every mineral found in the commonwealth of Pennsylvania, systematically arranged, the label on each marked with its proper and popular names, its locality and composition; and the second collection should be general, embracing duplicates of the first, and the minerals of all countries so arranged as to exhibit a complete classification of minerals according to the most approved system of mineralogy.

In every department of the museum whatever is found in Pennsylvania, whether animal, plant, mineral, rock or fossil, should

constitute a distinct cabinet, placed in juxtaposition with a complete general classification.

A great museum arranged in the manner suggested, as it is desired the collections of the academy shall be when a sufficiently capacious building for the purpose is erected, would enable an intelligent visitor, though previously uninformed on the subject, to learn more of the natural history and natural resources of Pennsylvania in a single day than he could acquire from a diligent study of books alone in a month. And its example might produce local museums. A society of natural sciences founded in every county, having in view the formation of cabinets of natural objects peculiar to it especially, would tend to accelerate the acquisition of knowledge of the natural resources of the State, particularly if exchanges and correspondence with each other and the Academy were established.

Such a museum would attract strangers, especially those of scientific disposition, to the city, and induce many to prolong their sojourn in it, advantageously to all who participate in supplying their wants. A thousand travellers are worth, on an average, three thousand dollars to the city every day they remain in it.

#### THE COST OF MUSEUMS.

The British museum, which is universal in its scope and character, is maintained at an annual cost of about a half million of dollars to the English government, without any pecuniary return. The museum of the Smithsonian Institution at Washington is supported at an expense of \$20,000 a year. Museums of every kind are maintained by every nation in Europe at governmental expense, and for reasons of state the labors of scientific inquirers in every field are facilitated and encouraged.

The State Museum at Albany, founded on the collections made by the geological survey of the State of New York, has cost the State, including the survey and the publication of its admirable reports, \$600,000 up to 1867; and since that date the legislature has appropriated \$20,000 annually for its preservation and increase, besides occasional appropriations for cases, repairs, &c. And it has recently granted \$500,000 towards establishing in the city of New York a museum of science and art.

Since its establishment in 1859, the museum of comparative



zoölogy at Cambridge Mass., has cost \$473,935. It is regarded as a part of the teaching apparatus of the Lawrence professor of comparative zoölogy of Harvard College, and receives considerable subsidies from the State.

It is estimated that at least \$300,000 have been spent since 1812, on the museum and library of the Academy of Natural Sciences, exclusive of the current expenses of the institution, which, though always most economically managed, may be reckoned at not less than \$2500 a year on an average. Add to this the value of the manual and mental labor voluntarily bestowed on the institution, and we shall find that its pecuniary worth is about a half million of dollars.

### THE USEFULNESS OF THE NATURAL SCIENCES.

In spite of their great expense, the propriety of cherishing the cultivation of the natural as well as other sciences is scarcely questionable at the present time.

The study of natural history has a happy influence on mental culture. While it tends to tranquillize and strengthen the mind, and to release it from the thralldom of superstition and credulity, it refines the taste and teaches man to appreciate justly the beauties and wisdom of nature. It is a drill, an exercise of the faculties in discriminating resemblances and in contrasting differences, and in the separation of truth from error. If it had no other object than to familiarize man with the wonders of the creation, intelligent people must perceive in this a sufficient inducement to encourage its study.

The natural sciences are not cultivated only to please the senses, to excite agreeable emotions, as music and painting usually are. It is urged that they are practically useful to agriculture, to the arts, and to medicine, and for this reason their study is worthy of the fostering care and encouragement of the community and the government. But it is not necessary or even expedient that every farmer, every artisan, and every physician should be a naturalist. Men ignorant of natural science successfully cultivate the soil, work at various trades, and practise medicine; but it cannot be denied that those vocations, many of them very lucrative, derive the principles upon which they are based from the studies and investigations of naturalists. One object of such

studies is to ascertain and establish principles, and to render them so plain and simple in application to every-day pursuits, that they may be available to those who have very little learning or intelligence. It needs no argument to prove that the successful pursuit of such an object is useful and worthy of commendation. The influence of the natural sciences in practical affairs is analogous to that of mathematics, which is everywhere regarded as an essential branch of liberal education. Very few of the thousands of men who navigate the ocean, build ships, construct steam-engines and various complicated machines, and guide them when in operation, have studied the problems of Euclid, or even heard of the Principia of Newton: but no one has ever been bold enough to assert, for such reasons, that the science of mathematics is not essential to the art of navigation, to naval architecture, or to the vocations of millwrights, machinists, or engineers.

The engineer in locating roads, in opening and working mines, derives facilities from a knowledge of the principles of geology. The utility of this branch of natural science is publicly acknowledged; many states have been at the expense of geological surveys for the purpose of ascertaining their mineral resources.

Knowledge of the natural sciences generally, facilitates the economic exploration of new countries, and enables the traveller almost at a glance to perceive the character of the soil and climate, as well as the value and qualities of their vegetable and mineral productions. But among the benefits which the natural sciences confer upon society, there is none more valuable than the assistance they afford those who toil to discover and study the laws of life, upon an accurate knowledge of which a rational system of medicine, true medical science, must be based. Physiology is indebted to the assiduous cultivation of these sciences, almost exclusively, for its present advanced condition.

Successful cultivation of the natural sciences needs a vast museum and an extensive library. To establish them, as has been shown, costs great and long-continued labor, and a large sum of money. The objects attainable through their agency are worth both. The condition of such an institution as the Academy of Natural Sciences is a standard by which the mental culture and liberality of communities may be measured and compared.

The wealth of the State of Massachusetts, according to the census of 1870, is \$1,537,816,504, and that of Pennsylvania,



\$2,616,590,647. In little more than ten years, the government of Massachusetts has granted \$265,000, and generous citizens have contributed \$258,935—an aggregate of more than \$523,000—to the museum of comparative zoölogy, established at Cambridge in 1859, mainly through the recommendation of professor Agassiz, as an accessory to the teaching apparatus of the University. The State of Pennsylvania, though more than twice as populous, and a thousand millions richer, has granted nothing towards fostering the Academy of Natural Sciences—a leading institution of the country—but the general public of Philadelphia has contributed to it something more than a hundred thousand dollars.

The museum at Cambridge is not the only institution founded for scientific teaching which has received aid from the legislature of Massachusetts. It granted an entire square of ground in the city towards the advancement of learning; one third, valued at \$90,000, as a site for a hall of the Boston Society of Natural History, and two thirds, about two acres, for the buildings of the Massachusetts Institute of Technology. To the latter it has also granted one-third of the income of the agricultural fund held by the State, amounting to about \$4000 a year. The expenses of the Institute, about \$50,000 annually, are defrayed from students' fees, amounting to about \$30,000, and from funds bequeathed or contributed by individuals, being the balance invested after expending for building, about \$300,000.

On June 1, 1870, the population of Massachusetts was 1,457,385. For the fiscal year 1868-69, the State government expended for schools \$4,419,200, or an average of more than \$3.03 a head. It has been said that, "Educated brain is the only commodity in which Massachusetts can compete with other States."\*

Pennsylvania, with a population of 3,515,993, expended in 1869 for the maintenance of her public schools \$6,986,148.92—or an average of \$1.98 per head.

It is unreasonable to expect her to compete triumphantly with other States in producing cultivated brains in the largest number and of the best quality until she spends as freely to obtain the machinery required in the manufacture. With nearly thrice the population and twice the wealth of Massachusetts, she spends a third less on education, proportionately to the number of inhabitants.

\* Report of the Commissioner of Education.

Mental culture is costly. There are distinctions more striking and cheaper, both to individuals and communities, attainable through the exercise of piety and charity, as well as through the agency of ornamental art. But to the common welfare of a city or nation, a single brain, completely cultivated, is of more importance than the most beautifully ornamented structure architect ever devised or raised. A huge architectural pile built for the accommodation of the offices of the municipal government, at a cost of twenty-five millions of dollars, admirable as it may be in external ornament, would be less attractive to our city, less creditable to the wisdom of the government and citizens, than the establishment of a single great institution of learning at an expense of one or two millions. Massachusetts is more widely known and respected through the University of Harvard than through all the products of architectural and other arts within the State. The bequest of £779 to the college by John Harvard in 1638 will keep his name on the roll of philanthropists forever.

A half million of dollars might be now profitably expended in erecting a building and arranging the museum on such a plan and scale as would enable the Academy to compare favorably with any other institution of the kind in the world. A half million is a large sum. But larger sums are expended in the construction of manufacturing establishments in every part of the country; no one charges that such expenditures are extravagant. Viewed rightly as an establishment for manufacturing accurate knowledge of the works of the Creator, a half million of dollars is comparatively a small amount to expend on such an institution.

But it asks now, to meet its present and pressing need, one-fourth of this sum, the estimated cost of erecting a part of an edifice, of barely sufficient capacity to expose fairly to view its natural treasures. The legislature of Pennsylvania has been petitioned to grant to the academy a subsidy of \$125,000 on condition that individual contributions to its building-fund shall be increased to the same amount.

#### PLAN OF THE PROPOSED BUILDING.

The building designed to be erected as soon as means will warrant the undertaking, is to be 184 feet in length by 66 feet wide, leaving an interior space of 176 by 60 feet. The eaves will



be 54 feet above the street. The elevation is in the college gothic style of architecture (plate I.), which permits almost indefinite extension without violating symmetry. Green serpentine has been selected for the external walls. The lighting and ventilation of the edifice have been well considered.

The cellar plan, besides room for coal and heating apparatus, provides convenient and well-lighted apartments for the use of taxidermists and printers.

The first story is 18 feet high in the clear. At the eastern extremity are the entrance from the street, stairway and hall, suitable apartments for the accommodation of curators, publication committee, male artists, and librarian; above these, on an entresol, rooms for the biological section, corresponding secretary, for duplicate specimens, and female artists.

The library floor, the first (plate II.), is 116 by 29 feet. On each side, opening into the library, are four rooms, 11 by 14 feet separated from each other by alcoves 9 feet wide, each lighted by a large window. The botanical and entomological cabinets are to be placed in apartments, each having a small work-room attached, at the western end of the library. Above these, on the entresol, are convenient rooms for the use of those having charge of the ornithological and conchological collections. The entresols at the opposite ends of the building are connected by the gallery which surrounds the library. This gallery forms the ceilings of the small committee-rooms which open into it. The alcoves separating these rooms are simply bridged, as far from the large windows as practicable, in order that light entering through them may meet little obstruction. All the apartments referred to are lighted by small windows marked in the elevation (plate III.). About one-ninth of the walls of the library consists of window glass. It is proposed, in the re-arrangement of the library, for the sake of convenience, to place in cases around the outside of each of the small rooms those books which are appropriate to the committee occupying it.

The second story will consist of a single saloon, 176 feet long, 60 feet wide, and 26 feet high, to the top of the wall, and 36 feet in the centre, surrounded by two broad galleries supported by light iron columns. The vertical cases will be placed on the floor and galleries of this apartment at right angles with the walls, having the corridor next to the latter, an arrangement believed to be

most favorable for examination of their contents, on account of light. The centre of the floor will be occupied by horizontal cases. More than a fourth of the museum walls consists of windows; and a sky light, 66 by 22 feet, will occupy the roof, so that it is confidently conjectured want of light will never be experienced in the museum.

Except the insects and plants elsewhere provided for, all the collections of the Academy are to be arranged in this proposed hall as well as its space will permit. There is no room in it for a proper lecture-room, nor for archæological collections, nor for a proper exposition of stratigraphic geology. Provision for all these is left to be made at some future day (see plate IV.).

Whether the idea of a complete museum of the natural sciences will ever be realized in Philadelphia, is a question which the future will determine. It may be, though at the cost of much labor and money, zealously employed for a long time; but no such result can be expected until a rational plan is first devised and its execution commenced.

The Academy is rich in materials for a foundation. Some of its collections approach completeness. Many of them are comparatively meagre. They all need space in which they may be spread out, each specimen distinct, and fully labelled, so that the deficiencies may be ascertained, and if possible, filled up. The extent of horizontal surface required for such purpose is very much greater than is generally supposed. If we estimate, for illustration, that on an average each mineral specimen with its label and tray, to be distinctly seen under glass, requires a space of three inches square we shall find that a collection of 5000 specimens will cover a surface 160 feet long and two feet wide. The cabinet of shells, of 20,000 species, will occupy at least four times as much surface for their proper display, or a length of 640 feet of the same width. These two collections so placed would extend a distance equal to the length of two of our city squares, say from Broad to Sixteenth streets. The large animals, elephant, polar bear, lion, bison, camel, &c. &c., require proportionally still greater space for satisfactory exhibition and examination. These data suggest that the accommodation of a great museum requires a very large building. In this city its dimensions should be sufficient in fact for the arrangement of two distinct museums of natural history: one to consist exclusively of what is peculiar to



Pennsylvania, systematically classified, labelled, and catalogued, and so arranged that all the natural resources of the commonwealth might be exhibited together. It should include those materials, for years packed away in Harrisburg, which were collected by the geological survey of the State, made by the late professor H. D. Rogers, and a suitable model of our coal fields. So large are these natural resources, in every department of natural science, that properly and completely to represent them will require nearly if not quite a third of the room provided in the proposed building (plate IV.).

The second should embrace the whole of the natural products of the earth without regard to locality. All specimens should be fully labelled and numbered in connection with a catalogue of the collection to which they pertain. Those belonging to this State should not be excluded from the general collection, and the visitor referred to the Pennsylvania museum; they should appear in their proper place in both classifications, so that their relations might be at once observed.

The several collections of mammals, birds with their nests and eggs, reptiles, fishes, mollusks, articulates, and radiates; minerals, rocks, and plants, should be arranged according to a systematic classification. A tangible exposition of stratigraphic geology requires to be made, as well as another of the fossils characteristic of strata and geological ages.

A series of skeletons and parts of skeletons, arranged so as to exhibit to students the homologies or structural affinities of vertebrate animals, is a necessary part of the plan. The department of ethnology, which has reference to the distinction of races of men, should embrace archæology, a museum of which includes only such artificial specimens as bear testimony to their aboriginal conditions, dating from man's first appearance in the world.

When adequate space is provided for them, and all the collections are classified and labelled in connection with catalogues of them, is it extravagant to hope that a lectureship appropriate to each may be established by endowments, so that the elements of every branch of the natural sciences may be taught in the institution by competent masters. In order to stimulate the lecturers to excel in popular teaching, it has been suggested that compensation for their services should be partly contingent on small fees from the members of their classes.

Re-arrangement of the museum in enlarged accommodations will greatly increase the current expenses of the institution. The care of it can no longer be confided, in any considerable degree, to voluntary or gratuitous labor. It is estimated that an annual income of \$10,000 from reliable sources will be necessary to meet the current and incidental expenditures. It is suggested that towards establishing a curator's fund, to be used for these purposes, the proceeds of the sale of the present hall be reserved.

This brief exposition of the claims of the Academy to favorable consideration, imperfect as it is, may satisfy the reader that the institution is educational in character; that it seeks no pecuniary profit; that the zeal, and labor, and money invested in it by the members yield no dividends, except in knowledge and the pleasure of knowing; that it has ever been conducted for the common advantage of all interested in the progress of science, in a spirit of benevolent liberality, and that it has contributed to the character of Philadelphia, as a seat of learning, and constitutes one of its attractions to intelligent strangers. Its museum is a book which can be read by all. Even those who cannot peruse any written or printed language may read it with pleasure and profit. The conduct of the Academy during a half century, indicates its future policy.

The enterprise to which public attention is invited, is to place the society in a new hall of suitable dimensions, and to establish for it a revenue equal to its current expenditure, which will probably increase, until perfectly equipped for work, in proportion to its capability to advance in the limitless field of natural science. This undertaking was begun five years ago, but it cannot be achieved without a large addition to the building-fund. The wealth of the Academy in materials and implements essential to scientific culture encumbers its progress. Its riches in one sense have rendered it poor in another. It needs assistance. All citizens disposed to cherish and extend the cultivation of the natural sciences in the community, are respectfully asked to give it pecuniary aid.

Without hospitals, asylums, colleges, libraries, reading-rooms, societies devoted to the cultivation of the arts and sciences and other institutions from which no direct pecuniary profit accrues to individuals who jointly give labor and money to form them, a



city would be poor. Without the existence of such institutions the aggregate of moneys in bank to the credit of individuals, great as it might be ; marble halls and temples, and mansions in addition, would not make the community attractive or happy. The presence of such establishments in a city is proof at once of the prosperity, intelligence, charity, and benevolence of some of the citizens. The wealth of the community apart from that of individuals, may be measured by the results of the labors of these few. In Philadelphia charitable and religious establishments of every kind abound, and the number of contributors to their support is very large. We are not excelled in these by any other city. But at this time, comparatively little interest is shown by the public generally, in the progress of societies and institutions founded for the advancement and diffusion of knowledge. Private benefactions, from a population of about 50,000 (New Haven, Ct.) for various departments of Yale College in the past twelve years, exceed a million of dollars, exclusive of \$150,000 given by the late George Peabody to its Natural History Museum. The application to the public which resulted in the building-fund of the Academy of Natural Sciences, still insufficient for its purposes, was answered favorably by less than 350 persons, a majority of them members of the society, out of a population estimated at nearly 800,000 souls, —an average of less than 1 in 2200. But it is supposed that the frank statement of the condition and purpose of the Academy here presented, if it can be made to reach them, ought to influence thousands instead of hundreds of intelligent and prosperous citizens to assist in the project of making this among the foremost institutions of natural science in Christendom. This appeal should not be in vain : its failure involves our reputation for interest in the progress of science, and in mental culture of a higher order than can be had in our public schools.

Remembrance of the founders of the Academy as well as of many men known in science, who have labored for its advancement, suggests that this monument of their benevolent and intelligent exertions, this cenotaph common to them all, should always be kept fresh and in harmony with the progress of the age. In some degree every contribution to this enterprise may be regarded as a tribute to the memory of such men as De Schweinitz, Raffinesque, William Bartram, Thomas Nuttall, William Maclure,

C. A. Lesueur, Thomas Say, George Ord, Lardner Vanuxem, Richard Harlan, William H. Keating, John Godman, William Parker Foulke, Thomas B. Wilson, Reuben Haines, Ed. Hallowell, George Ord, Samuel George Morton, John Cassin, Elisha K. Kane, John B. Budd, Wm. P. Wilstach, A. E. Jessup, Elizabeth Stott, Isaac Barton, and many others whose memories are directly or indirectly associated with the progress of the natural sciences in Philadelphia. Every benefaction to an enterprise which they did so much in their lives to advance, implies approbation of their labors in the cause, and is calculated to cheer scientific students in their onward course.

All are requested to consider the claims of the institution, to examine the conditions of subscription proposed, and subscribe such amount as may seem expedient.

Subscriptions or immediate contributions to the building fund of the Academy of Natural Sciences of Philadelphia, will be received by any member of

#### THE COMMITTEE ON THE BUILDING FUND.

ROBERT BRIDGES,  
EDWARD D. COPE,  
D. B. CUMMINGS,  
J. W. DREXEL,  
J. GILLINGHAM FELL,  
HENRY C. GIBSON,  
JOHN S. HAINES,  
JAMES C. HAND,  
JOS. HARRISON, Jr.,  
W. B. HAZELTINE,  
WM. C. HENSZEY,  
B. A. HOOPES,  
S. B. HOWELL,  
ISAAC LEA,  
JOS. LEIDY,  
CHARLES LENNIG,  
J. P. LESLEY,  
WM. L. MACTIER,

J. B. MCCREARY,  
THOMAS MEEHAN,  
EDWARD PARRISH,  
JOHN H. REDFIELD,  
W. S. W. RUSCHENBERGER,  
CHARLES E. SMITH,  
T. GUILFORD SMITH,  
THOMAS SPARKS,  
GEO. W. TRYON, Jr.,  
WM. S. VAUX,  
JOHN WELSH,  
JOS. WHARTON,  
EDW. S. WHELEN,  
S. S. WHITE,  
HENRY WINSOR,  
H. W. WORKMAN,  
H. C. WOOD, Jr.



## SUBSCRIPTIONS PAID TO THE BUILDING FUND

OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA UP TO MAY 1, 1871.

Charles Lenning, a tract of land, from which have been realized \$2156	Thomas Clyde.....	\$500
Alfred Cope.....	A. Campbell.....	500
Clement Biddle.....	A. J. Drexel.....	500
Lewis Audenried.....	G. W. Fahnestock.....	500
John B. Budd.....	R. H. Gratz.....	500
Adolph E. Borie.....	I. P. Hutchinson.....	500
Matthew Baird.....	H. H. Houston.....	500
Isaac Barton.....	Miss Ann Haines.....	500
John Baird.....	H. C. Lea.....	500
C. H. Borie.....	Benjamin Marshall.....	500
Wm. Bucknell.....	McCallum, Crease & Sloan.....	500
John A. Brown.....	Joseph F. Page.....	500
Chas. S. Coxe.....	French, Richards & Co.....	500
F. R. Cope.....	Merrick & Sons.....	500
T. P. Cope.....	Thomas Smith.....	500
Jay Cooke.....	Henry Seybert.....	500
E. W. Clarke & Co.....	Charles E. Smith.....	500
Wm. Camac.....	Charles Taylor.....	500
J. G. Fell.....	J. Edgar Thomson.....	500
John Gibson, Son & Co.....	Geo. F. Tyler.....	500
J. S. Haines.....	Samuel Welsh.....	500
Miss Jane R. Haines.....	Henry Winsor.....	500
Horstmann & Co.....	James A. Wright.....	500
Samuel Jeanes.....	Ed. S. Whelen.....	500
Joshua T. Jeanes.....	Isaac S. Waterman.....	500
Joseph Jeanes.....	John Welsh.....	500
Fred. Klett.....	Rockhill & Wilson.....	500
Elias D. Kennedy.....	Rich. D. Wood, a certificate for \$500 of Schuylkill Navigation Co., loan of 1882, valued at....	400
Joseph S. Lovering.....	D. B. Cummins.....	300
Isaac Lea.....	C. P. Bayard.....	250
Wm. G. Moorhead.....	G. S. Benson.....	250
Massey, Huston & Co.....	J. E. Caldwell.....	250
H. P. McKean.....	Jos. W. Drexel.....	250
Wistar Morris.....	Thomas Earp.....	250
Thomas Potter.....	Frederic Graff.....	250
John Rice.....	Frank Haseltine.....	250
Thomas Sparks.....	James C. Hand.....	250
Thos. A. Scott.....	B. Hammitt.....	250
Geo. W. Tryon, Jr.....	Wm. Hay.....	250
Morris, Tasker & Co.....	E. C. Knight.....	250
Wm. S. Vaux.....	Jos. S. Lovering, Jr.....	250
W. P. Wilstach.....	Francis W. Lewis.....	250
S. Morris Waln.....	John Livezey.....	250
A. Whitney & Sons.....	Joshua Lippincott.....	250
Wood, Morrell & Co.....	Richard M. Marshall.....	250
I. V. Williamson.....	Israel Morris.....	250
W. Weightman.....	Samuel C. Morton.....	250
A. J. Antelo.....	Charles Magarge.....	250
John Bohlen.....	Horace Magee.....	250
Miss Bohlen.....	Jas. Ronaldson Magee.....	250
W. A. Blanchard.....	Joseph Patterson.....	250
Alexander Biddle.....	Moro Phillips.....	250
Thos. A. Biddle.....	Mrs. Eleanor P. Long.....	250
Stephen Colwell.....	Lawrence S. Pepper.....	250
Caleb Cope.....	George S. Pepper.....	250
Miss R. A. Cope.....	Evan Randolph.....	250
Lewis Cooper.....		

Charles Spencer.....	\$250	E. M. Hopkins.....	\$100
P. W. Sheaffer.....	250	Pemberton S. Hutchinson.....	100
John T. Taitt.....	250	George Harding.....	100
John B. Trevor.....	250	E. L. Handy.....	100
George Vaux.....	250	John Haseltine.....	100
Mrs. E. H. Vaux.....	250	C. H. Hutchinson.....	100
Wm. Welsh.....	250	A. A. Henderson.....	100
Morris Wheeler & Co. ....	250	Huneker & Brant.....	100
Charles Wheeler.....	250	John Jordan, Jr. ....	100
A. Whilldin.....	250	W. P. Jenks.....	100
Wm. R. White, Jr.....	250	John Krider.....	100
Joseph Wharton.....	250	John Lambert.....	100
Benjamin Bullock.....	250	Joseph Leidy.....	100
Atherton Blight.....	200	Chas. S. Lewis.....	100
Cash, per Dr. Chas. Shaeffer.....	200	George T. Lewis.....	100
John C. Davis.....	200	John T. Lewis.....	100
Charles Humphreys.....	200	J. L. Le Conte.....	100
J. D. Rosengarten.....	200	Amos R. Little.....	100
C. B. Wright.....	200	W. R. Lejee.....	100
Chas. J. Allen.....	100	J. Dickinson Logan.....	100
Joseph B. Altemus.....	100	A. Sidney Logan.....	100
Abr. Barker.....	100	Benj. V. Marsh.....	100
Ch. S. Boker.....	100	John McAllister, Jr.....	100
S. B. Barcroft.....	100	Joseph Wm. Miller.....	100
Alexander Benson.....	100	J. B. Myers.....	100
Charles N. Bancker.....	100	Nathan Myers.....	100
John J. Borie.....	100	Jos. B. Myers.....	100
Henry B. Benners.....	100	Wm. L. Mactier.....	100
Joel J. Baily.....	100	Isaac P. Morris.....	100
Edw. C. Biddle.....	100	Matthews & Moore.....	100
Eugene Borda.....	100	Wm. Musser.....	100
David S. Brown.....	100	John B. Mellor.....	100
A. Benson, Jr.....	100	Wm. Mellor.....	100
F. L. Bodine.....	100	G. H. Newhall.....	100
Bowen & Fox.....	100	Charles Norris.....	100
Robert Carter.....	100	Wm. F. Norris.....	100
Andrew C. Craig.....	100	G. W. Norris.....	100
Charles C. Cresson.....	100	John S. Newbold.....	100
Lemuel Coffin.....	100	G. F. Peabody.....	100
C. Colket.....	100	John B. Parker.....	100
Edmund Draper.....	100	Samuel Powel.....	100
Mark Devine.....	100	Charles W. Poultney.....	100
Ferdinand J. Dreer.....	100	J. S. Phillips.....	100
J. Coleman Drayton.....	100	Philip Physick Peace.....	100
Joseph H. Dulles.....	100	E. Coleman Peace.....	100
Wm. Evans, Jr.....	100	James W. Queen.....	100
Miss Elizabeth R. Fisher.....	100	Richard Richardson.....	100
A. L. Elwyn.....	100	Wm. Rowland & Co.....	100
G. Emerson.....	100	Evans Rogers.....	100
Charles Ellis.....	100	C. H. Rogers.....	100
Saml. M. Fox.....	100	Solomon W. Roberts.....	100
J. Edward Farnum.....	100	Josiah Reigel.....	100
J. M. Foltz.....	100	Samuel R. Shipley.....	100
C. H. Garden.....	100	Charles Santee.....	100
Philip C. Garrett.....	100	Louis Starr.....	100
Constant Guillou.....	100	Daniel Smith, Jr.....	100
L. A. Godey.....	100	Ed. A. Souder & Co.....	100
Daniel Haddock, Jr.....	100	Jos. Scattergood.....	100
Harry C. Hart.....	100	Geo. J. Scattergood.....	100
Wm. H. Hart.....	100	Wm. Struthers.....	100
C. J. Hoffman.....	100	Charles L. Sharpless.....	100
F. A. Hoyt & Bro.....	100	Wm. H. Sowers.....	100



Aubrey H. Smith .....	\$100	E. H. ....	\$50
J. Rinaldo Sank.....	100	J. H. Hutchinson.....	50
J. H. Slack.....	100	O. A. Judson.....	50
W. L. Schaffer.....	100	H. C. Kennedy .....	50
Charles Smith.....	100	Chs. M. Leisenring .....	50
John Supplee .....	100	Levi Morris.....	50
J. D. Sergeant.....	100	Merrihew & Son.....	50
Joseph P. Smith.....	100	Chs. Norris, Jr.....	50
James Spear.....	100	P. S. Peterson .....	50
W. P. Tatham.....	100	C. J. Price .....	50
Samuel B. Thomas.....	100	E. F. Rivinus .....	50
B. T. Tredick.....	100	E. L. Reakirt.....	50
Wm. G. Thomas .....	100	John Turner .....	50
Alfred Vezin .....	100	J. B. Vandusen.....	50
Henry A. Vezin .....	100	Chs. S. Wurts .....	50
H. M. Watts .....	100	Alexander Wilcocks.....	50
Wm. S. Wilson.....	100	F. L. Williams .....	50
Ellwood Wilson.....	100	Wm. P. Bancroft .....	25
Joseph Walton .....	100	Chs. M. Ghiskey.....	25
Mrs. C. S. Wurts .....	100	Louis A. Godey.....	25
Richard Wood.....	100	John O. James.....	25
John Welsh, Jr.....	100	Geo. S. Jones.....	25
Miffin Wistar .....	100	S. Weir Mitchell.....	25
Charles Wise.....	100	Thomas Meehan.....	25
John Wister.....	100	E. M. Needles.....	25
Ellis Yarnall .....	100	John Pearsall.....	25
James T. Young.....	100	C. F. Parker .....	25
Moses Brown .....	50	Wm. W. Paul .....	25
Charles Cabot.....	50	Geo. A. Smith.....	25
George Cromelien .....	50	T. Guilford Smith.....	25
E. Durand .....	50	John Warner.....	25
R. D. ....	50	D. L. Woods .....	25
John W. Field.....	50	Sundry small subscriptions.....	158
R. Guillou .....	50		
Isaac Hays.....	50	Total.....	\$94,139

## SUMMARY OF SUBSCRIPTIONS.

<i>Paid.</i>		<i>Unpaid.</i>	
1 (Chas. Lennig) .....	\$2,156	(Including \$900 payable in ma-	
1 (Alfred Cope).....	1,500	terials.)	
1 (Clement Biddle) .....	1,100	.....	
44 \$1000 each .....	44,000	8 .....	\$8,000
37 500 " .....	18,500	9 .....	4,500
1 — — .....	400	.....	
1 — — .....	300	.....	
40 250 " .....	10,000	4 .....	1,000
6 200 " .....	1,200	4 .....	800
132 100 " .....	13,200	6 .....	600
25 50 " .....	1,250	5 .....	250
15 25 " .....	375	1 .....	25
Small subscriptions.....	158	.....	
304 Paid.....	\$94,139	37 Unpaid.....	\$15,175

138 members of the Academy, elected prior to Dec. 1865,  
subscribed..... \$45,525  
60 members elected since ..... 32,900

From 198 members ..... \$78,425  
Persons not members of the Academy..... 30,889

Total subscriptions..... \$109,314

## EXPLANATION OF THE PLATES.

DRAWN ON STONE, AND PRESENTED BY E. J. NOLAN, M.D.

PLATE I.—Perspective view of the building designed for the Academy of Natural Sciences. The part of the drawing which is between the points marked 1 and 2, represents the north wing, which it is purposed to erect as soon as practicable.

PLATE II.—Plan of the first floor.

1. Committee room, 11 by 14 feet, lighted by a window, and ground-glass door opening into the library.

2. Alcove, between committee rooms, bounded by a large window at one extremity, and the library saloon at the other. The drawing shows that the windows in the opposite walls do not correspond, but alternate with each other.

3. Librarian's office.

9. Conversation room; over it, biological and microscopic room.

4. Fire-proof.

10. Lobby.

5. Closets.

6. Male artists; over it, female artists.

11. Entrance, vestibule, and stairs.

7. Publication office; above it, Corresponding Secretary's room.

12. Entomological cabinet; over it, ornithological work-room.

8. Curator's room; over it, duplicate room.

13. Botanical cabinet; over it, conchological work-room.

f. Flue for ventilation.

PLATE III.—Street elevation of north wing, showing position of sky-light, of circular windows which open upon the gallery of the library, and of the small windows which light the committee rooms.

PLATE IV.—Topographic diagram of the lot purchased by the trustees of the building-fund for the new hall of the Academy of Natural Sciences. It is bounded on the north by Race street; on the south by Cherry street; on the east by Nineteenth street; and on the west by a public school-ground, by Toland street, which communicates with Twentieth street, and by a cemetery.

The diagram of the plan designed for the entire building shows three wings, or rather a centre edifice with an L-shaped wing on each side of it

It is proposed that the north or Race street wing only, with the janitor's residence, shall be erected now. It will contain the library, work and committee rooms, printing office; the cabinets of entomology, of botany, of microscopy, and the general zoölogical museum, including the Wilson collection of birds.

There will be left for the occupancy of the south or Cherry street wing, a laboratory and lecture room; and above them, the comparative anatomy collections; the museum to illustrate the natural resources and products of Pennsylvania, will require the centre; leaving the north and south connecting buildings to be occupied by the museums of stratigraphic geology, palæontology, ethnology, and archæology.



PLATE II.

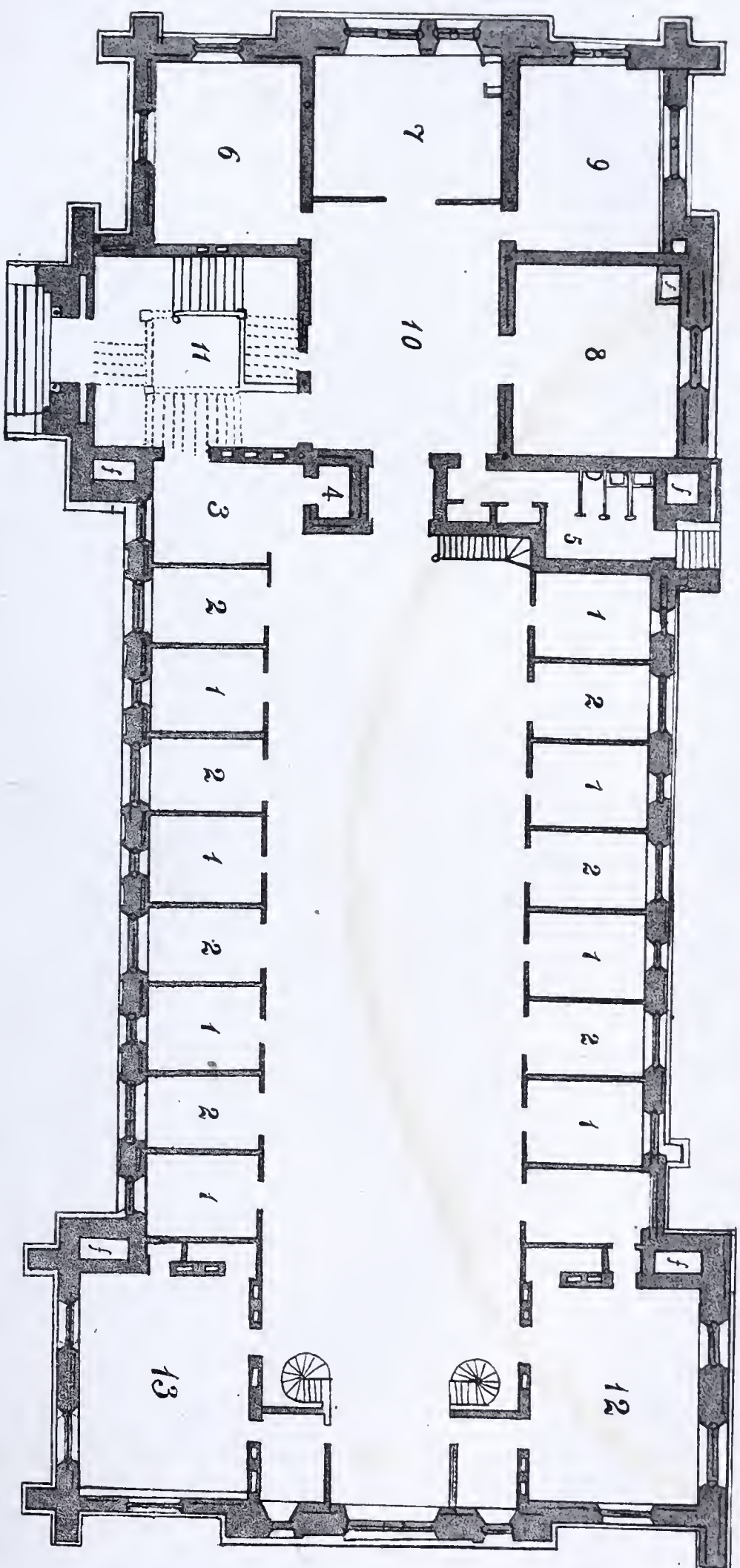
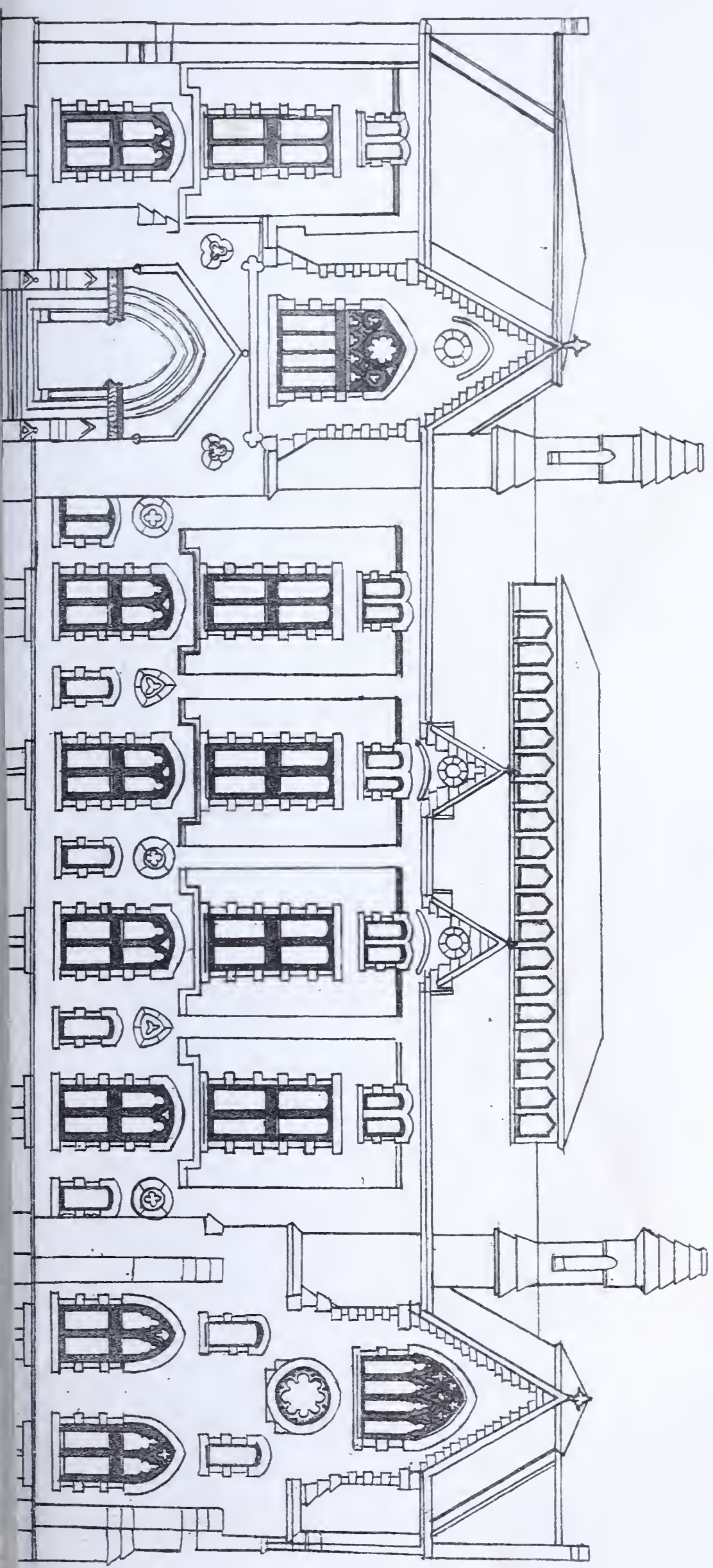




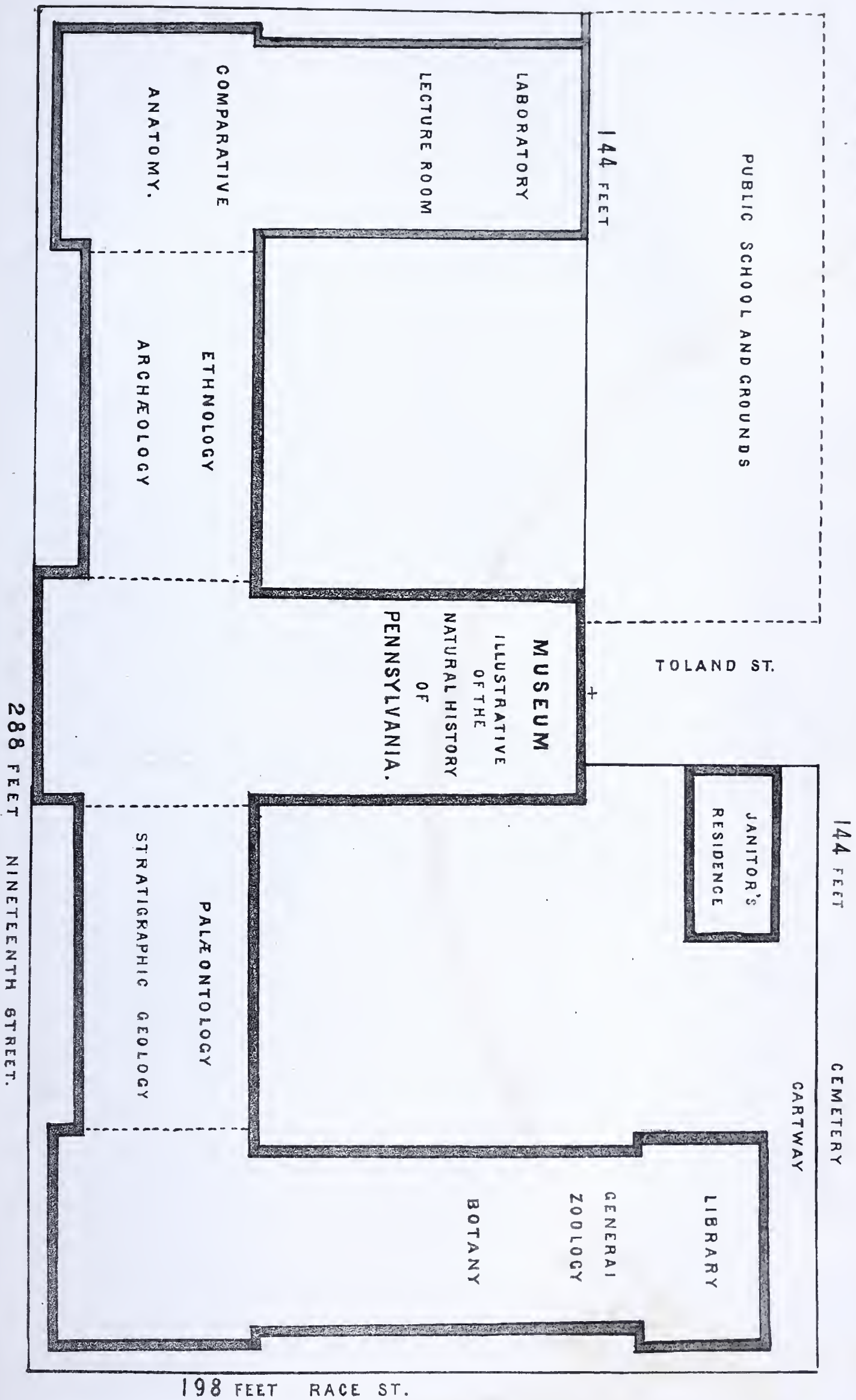


PLATE III.















# PUBLICATIONS OF THE ACADEMY OF NATURAL SCIENCES, OF PHILADELPHIA.

Seven volumes of the New Series of the JOURNAL (Quarto) have been issued—1847 to 1870. The price per volume of four parts is \$10.00, or \$3.00 per part to subscribers; and to others, \$16.00 per volume, or \$3.75 per part; except Vol. 7—containing “The Extinct Mammalian Fauna of Dakota and Nebraska, with a Synopsis of the Mammalian Remains of North America. Illustrated with thirty plates. By JOSEPH LEIDY, M.D., LL.D.—which can be had separately for \$20.00.

The FIRST SERIES OF THE JOURNAL, 1817 to 1842, in eight volumes, octavo, may be obtained at \$24.00, or for separate volumes \$3.25 per volume.

The FIRST SERIES OF THE PROCEEDINGS of the Society, published in octavo, 1841 to 1856, of which eight volumes were completed Dec. 31, 1856, may be obtained at \$24.00, to members; and to the public, \$30.00.

The SECOND SERIES OF THE PROCEEDINGS, commencing January 1, 1857 (of which fourteen volumes were completed Dec. 31, 1870), may be obtained at \$42.00, to members, or \$3.00 per volume separately; and to the public, \$3.75 per volume.

The THIRD SERIES OF THE PROCEEDINGS, ILLUSTRATED, commencing January 1st, 1871, is published at \$3.00 per annum, payable in advance, to members; and to the public, \$3.75.

AMERICAN JOURNAL OF CONCHOLOGY, 1865–70. Six vols. 8vo. Containing 2500 pages, illustrated by one hundred and fifty plates, many of them colored, besides about a thousand wood engravings. Published at \$60.00. Price reduced to \$36.00 for the set.

AMERICAN JOURNAL OF CONCHOLOGY, Vol. VII., 1871. Now in course of publication. Price \$10.00, payable in advance.

The Society has established a Publication Fund; any person who may contribute the sum of \$75.00, will receive, during life, the JOURNAL, quarto, and the PROCEEDINGS, octavo; or separately, the JOURNAL \$50.00, and the PROCEEDINGS \$25.00.

## BOOKS FOR SALE.

The ACADEMY have the following works for sale at the prices affixed:—

MICHAUX' NORTH AMERICAN SYLVA. 2 vols. octavo. Philadelphia, 1841, with 156 uncolored plates. \$10.00.

DESCRIPTION OF SHELLS OF NORTH AMERICA, with 68 colored plates. By THOMAS SAY, 1830–34. \$10.50.

MONOGRAPH OF THE TERRESTRIAL MOLLUSCA OF THE UNITED STATES. With Illustrations of all the Species. By GEORGE W. TRYON, Jr. Fine edition, plate paper, with duplicate plates, colored and tinted. \$20.00. Colored edition, \$13.50; plain edition, \$8.50. Only one hundred copies printed, which have been mostly sold.

MONOGRAPH OF THE FRESH-WATER UNIVALVE MOLLUSCA OF THE UNITED STATES. By S. S. HALDEMAN, 1840–44. With CONTINUATION to 1871. By GEORGE W. TRYON, Jr. 2 vols., with many colored plates. Fine edition, duplicate plates, \$40.00; with colored plates, \$25.00; with plain plates, \$18.00.

Either the original work or the continuation furnished separately, if desired.

NOTICE TO BOOKSELLERS.—All the Publications of the Society will be supplied to Booksellers at a discount of 20 per cent. on the prices charged to the public.

Application to be made to WM. S. VAUX, Chairman of the Publication Committee, 1702 Arch Street, or to the Librarian, at the Hall of the Academy, corner of Broad and Sansom Streets.

AGENTS, {	London, TRÜBNER & CO.,
	No. 60 Paternoster Row.
	New York, WM. WOOD & CO.,
	No. 61 Walker Street.
	Salem, Mass., NATURALIST'S AGENCY.

January, 1871.